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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/681,771	06/02/2001	Eric D. Brill	MCS-004-01	7610

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LYON & HARR, LLP
300 ESPLANADE DRIVE, SUITE 800
OXNARD, CA 93036

EXAMINER	
STORK, KYLE R	

ART UNIT	PAPER NUMBER
2178	

DATE MAILED: 05/31/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/681,771	BRILL ET AL.	
	Examiner	Art Unit	
	Kyle R Stork	2178	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 May 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-5,7-25 and 27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 3-5, 7-25, and 27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This office action is in response to the request for continuing examination filed 4 May 2005 and the amendments filed 7 April 2005.

2. Claims 1, 3-5, 7-25, and 27 are pending. Claims 6 and 26 are cancelled by the amendment.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

4. Claims 1, 3-5, 7-10, 25, and 27 remain rejected under 35 U.S.C. 102(a) as being anticipated by Brill et al. (An Improved Error Model for Noisy Channel Spelling Correction, 2000, hereafter Brill).

As per independent claim 1, Brill discloses a method for spelling correction of a phrasal string comprising:

- Segmenting the phrasal string into a plurality of different segmentations (page 3, paragraphs 2-6: Here, the word phrasal strings physical and fisikle are segment into different segmentations)

- Using dictionary looping to spell correct each of the plurality of different segmentations (pages 4-5, section "Applying the Model": Here dictionary looping is described (specifically on page 5, paragraph 2))
- Determining a cost associated with each of the plurality of different segmentations, the plurality of different segmentations including contiguous sub-strings over the phrasal string, each of the contiguous sub-strings containing a plurality of words (pages 4-5, section "Applying the Model": Here, the cost is the distance)
- Identifying segmentations having a lowest cost corresponding to a most probable correct spelling of the phrasal string (page 2, section "An Improved Error Model": Here, the lowest cost (minimum number of insertions, substitutions, and deletions) are identified)

As per dependent claim 3, Brill discloses the method wherein dictionary looping further comprises comparing each of the plurality of different segmentations with entries in a phrasal dictionary (pages 4-5, section "Applying the Model": Here, a dictionary D is compiled into a trie of corresponding vectors and weights).

As per dependent claim 4, Brill discloses the method wherein the dictionary is capable of containing phrasal strings including phrases, words, and spaces (page 1, section "Noisy Channel Spelling Correction," paragraph 1: Here, the dictionary contains string elements of Σ^*, which, by definition, contains all possible combination of characters, including phrases, words, and spaces).

As per dependent claim 5, Brill discloses the method wherein the cost is a cost of correcting each of the plurality of different segmentations (pages 3-4, section "Training the Model": Here, the cost is the same is minimizing the edit distance through the number of edits necessary).

As per dependent claim 7, Brill discloses the method further comprising spell correcting sub-strings of a segmentation using dictionary looping (pages 4-5, section "Applying the Model").

As per dependent claim 8, Brill discloses the method wherein dictionary looping further comprises performing a looping search through a phrasal dictionary to compare each of the sub-strings with entries in the phrasal dictionary to find an entry having a closest match (pages 4-5, section "Applying the Model").

As per dependent claim 9, Brill discloses the method further comprising construction a corrected segmentation using the closest match for each of the sub-strings (pages 3-5, sections "Training the Model" and "Applying the Model").

As per dependent claim 10, Brill discloses the computer readable medium containing computer-executable instructions for performing the process of claim 1 (page 5, column 2: Here, it is disclosed that the process is carried out on a Dell 610 500mhz, Pentium III workstation).

As per independent claim 25, Brill discloses the method for spelling correction of a misspelled phrasal string containing words, spaces, and characters, comprising:

- Dividing the misspelled phrasal string into a plurality of different segmentations containing sub-strings containing a plurality of words (page 3, paragraphs 2-6:

Here, the word phrasal strings physical and fisikle are segment into different segmentations)

- Performing dictionary looping of a trie containing a phrasal dictionary to search for each of the sub-strings in the trie (pages 4-5, section "Applying the Model": Here dictionary looping through the use of tries is described (specifically on page 5, paragraph 2))
- Comparing each of the sub-strings to entries in the trie to find a closest match to the sub-string (page 2, section "An Improved Error Model": Here, the lowest cost (minimum number of insertions, substitutions, and deletions) are identified)
- Constructing a corrected phrasal string using the closest sub-string trie matches (pages 5-7, section "Results": Here, the system returned several possible spelling correction suggestions, with the lowest cost being the first choice presented)

As per dependent claim 27, Brill discloses the method further comprising dividing the misspelled phrasal string into all possible segmentations (pages 4-5, section "Applying the Model": Here, all possible combination of phrasal strings to the right and left of a given phrasal string are stored in tries used to determine the most probable correction).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 11-24 remain rejected under 35 U.S.C. 103(a) as being unpatentable over Brill in further view of Birman et al. (US 6616704, application 2000, hereafter Birman).

As per independent claim 11, Brill discloses a method for spelling correction of a misspelled phrasal string containing words, spaces, and characters, comprising:

- Receiving the misspelled phrasal string (page 3, paragraphs 2-6: Here, the word phrasal string fisikle is a misspelled phrasal string. It is further divided into phrasal strings f-i-s-i-k-le)
- Dividing the phrasal string into a plurality of segmentations (page 3, paragraphs 2-6: Here, the word phrasal strings physical and fisikle are segment into different segmentations)
- Comparing each of the plurality of segmentations to entries in a dictionary (pages 4-5, section "Applying the Model": Here dictionary looping is described (specifically on page 5, paragraph 2). Dictionary looping includes comparing segmented entries to a dictionary)
- Determining a best segmentation from the plurality of segmentations that represent the most probably correct spelling of the misspelled phrasal string (page 2, section "An Improved Error Model": Here, the lowest cost (minimum number of insertions, substitutions, and deletions) are identified)

Brill further discloses sub-string not restricted to a single word (page 3, paragraphs 2-6: Here, fisikle is segmented into pieces that are each less than one word in length). However, Brill does not specifically disclose the method wherein the phrasal string contains a plurality of words. However, Birman discloses the method wherein the phrasal string contains a plurality of words (column 2, lines 54-67: Here, a phrasal string that contains more than one word is spell checked through looping through the phrase until each word has been corrected).

It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to have combined Brill's method of spelling correction through segmentation into phrasal strings with Birman's method for spelling correction of a phrasal string containing a plurality of words, since it would have allowed a user to spell check an entire document instead of spell checking a single word.

As per dependent claim 12, Brill and Birman disclose the limitations similar to those in claim 11 and the same rejection is incorporated herein. Brill further discloses the method wherein each of the plurality of segmentations contains contiguous sub-strings (page 3, paragraphs 2-6: Here, the word phrasal string fisikle is a misspelled phrasal string. It is further divided into phrasal strings f-i-s-i-k-le. These segmentations are contiguous).

As per dependent claim 13, Brill and Birman disclose the limitation similar to those in claim 12, and the same rejection is incorporated herein. Brill further discloses the method wherein comparing each of the plurality of segmentations to entries in a dictionary is performed by finding a closest match between sub-strings of a

segmentation and a dictionary entry (pages 3-5, sections "Training the Model" and "Applying the Model": Here, on page 4, the number of edits necessary to correct a misspelling to the correct spelling is used to determine the "closest match" to a sub-string. Further, on page 5, the number of edits necessary for correction, edit distance, is used in conjunction with a dictionary trie to determine the "closest match").

As per dependent claim 14, Brill and Birman disclose the limitations similar to those in claim 11, and the same rejection is incorporated herein. Brill further discloses the method further comprising determining a cost associated with each segmentation (pages 3-4, section "Training the Model": Here, on page 4, the number of edits necessary to correct a misspelling to the correct spelling is used to determine the cost of correcting a sub-string segmentation).

As per dependent claim 15, Brill and Birman disclose the limitations similar to those in claim 14, and the same rejection is incorporated herein. Brill further discloses the method wherein the best segmentation is a segmentation having a lowest cost (page 2, section "An Improved Error Model": Here, the minimum distance between the two strings in used).

As per dependent claim 16, Brill and Birman disclose the limitations similar to those in claim 14, and the same rejection is incorporated herein. Brill further discloses the method wherein hierarchical parameters are used to determine the cost associated with each segmentation (pages 3-4, section "Applying the Model": Here, a hierarchical tries are used to represent data on the left and right sides of a substitution. The tries are used to determine the edits necessary for correction).

As per dependent claim 17, Brill and Birman disclose the limitations similar to those in claim 16, and the same rejection is incorporated herein. Brill further discloses the method wherein hierarchical parameters include at least one of: (a) a length of a dictionary entry; (b) a probability of a dictionary entry given a context of neighboring words in the phrasal string (pages 3-4, section "Applying the Model": Here, a hierarchical tries are used to represent data on the left and right sides of a substitution. The tries are used to determine the edits necessary for correction. By determining the edits necessary for correction, the probability of determining the correct word is determined).

As per independent claim 18, Brill discloses a phrasal spelling correction system for spelling correction of a phrasal string, comprising:

- A segmentation module that divides the phrasal string into a plurality of segmentations, each of the plurality of segmentations containing sub-strings (page 3, paragraphs 2-6: Here, the word phrasal strings physical and fisikle are segment into different segmentations)
- A looping comparator that performs dictionary looping to correct a segmentation by looping through a dictionary and comparing each of the sub-strings of the segmentation with entries in the dictionary to determine a closest match (pages 4-5, section "Applying the Model": Here dictionary looping is described (specifically on page 5, paragraph 2))
- An output string containing a corrected segmentation having a lowest cost that represents a correct spelling of the phrasal string (pages 5-7, section "Results":

Here, the system returned several possible spelling correction suggestions, with the lowest cost being the first choice presented)

Brill further discloses sub-string not restricted to a single word (page 3, paragraphs 2-6: Here, fisikle is segmented into pieces that are each less than one word in length). However, Brill does not specifically disclose the method wherein the phrasal string contains a plurality of words. However, Birman discloses the method wherein the phrasal string contains a plurality of words (column 2, lines 54-67: Here, a phrasal string that contains more than one word is spell checked through looping through the phrase until each word has been corrected).

It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to have combined Brill's method of spelling correction through segmentation into phrasal strings with Birman's method for spelling correction of a phrasal string containing a plurality of words, since it would have allowed a user to spell check an entire document instead of spell checking a single word.

As per dependent claim 19, the applicant discloses the limitations similar to those in claim 14. Claim 19 is similarly rejected under Brill and Birman.

As per dependent claim 20, the applicant discloses the limitations similar to those in claim 16. Claim 20 is similarly rejected under Brill and Birman.

As per dependent claim 21, the applicant discloses the limitations similar to those in claim 17. Claim 21 is similarly rejected under Brill and Birman.

As per dependent claim 22, the applicant discloses the limitations similar to those in claim 4. Claim 22 is similarly rejected under Brill in view of Birman.

As per dependent claim 23, Brill and Birman disclose the limitations similar to those in claim 22, and the same rejection is incorporated herein. Brill further discloses the method further comprising a dynamic update module that provides dynamic updating of phrasal string dictionary updates (page 2, column 2: Here, words that are not in the dictionary but are not more than one edit away are used to update the dictionary but adjusting the probabilities of specific corrections).

As per independent claim 24, Brill discloses the method of spelling correction of a phrasal string comprising:

- Segmenting the phrasal string into a plurality of different segmentations containing substrings (page 3, paragraphs 2-6: Here, the word phrasal strings physical and fisikle are segment into different segmentations)
- Using dictionary looping to perform a plurality of different searches through a dictionary data structure such that each of the different searches begins at a starting node and continually loops back to the starting node to begin another search in order to compare each of the sub-strings with entries in the dictionary data structure (pages 4-5, section "Applying the Model": Here dictionary looping is described (specifically on page 5, paragraph 2). Further, since all possible combination of the left hand and right hand sides of a possible correction are generated in trie form, upon completion of one trace through the trie, a second trace would be required to start from the starting node. This node tracing would continue looping back to the starting node and tracing through the possibilities

until all possible combination were traced to determine each probability that a change is correct)

- Determining a cost for correction associated with each of the plurality of different segmentations (pages 4-5, section "Applying the Model": Here, the cost is the distance)
- Identifying a segmentation having a lowest cost of correction corresponding to a most probably correct spelling of the phrasal string (page 2, section "An Improved Error Model": Here, the lowest cost (minimum number of insertions, substitutions, and deletions) are identified)

Brill further discloses sub-string not restricted to a single word (page 3, paragraphs 2-6: Here, fisikle is segmented into pieces that are each less than one word in length). However, Brill does not specifically disclose the method wherein the phrasal string contains a plurality of words. However, Birman discloses the method wherein the phrasal string contains a plurality of words (column 2, lines 54-67: Here, a phrasal string that contains more than one word is spell checked through looping through the phrase until each word has been corrected).

It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to have combined Brill's method of spelling correction through segmentation into phrasal strings with Birman's method for spelling correction of a phrasal string containing a plurality of words, since it would have allowed a user to spell check an entire document instead of spell checking a single word.

Response to Arguments

7. Applicant's arguments filed 7 April 2005 have been fully considered but they are not persuasive.

As per independent claims 1, 11, 18, 24, and 25, the applicant argues that Brill does not perform partitioning on a string that is comprised of a plurality of words (page 7, paragraph 2). The applicant argues that "'the examiner agrees with the applicant's argument that Brill performs partitioning on a single word, however, the amended claim limitations do not disclose the requirement that the sub-string be comprised of a plurality of words' (Office Action, bottom of page 7 to top of page 8)" (page 7). The examiner does not agree with the applicant's assessment that Brill does not include the "feature that the substring is comprised of a plurality of words". The examiner's assertion was in response to the applicant's argument "that Brill fails to disclose dividing a misspelled phrasal string into a plurality of segmentations not containing sub-strings not restricted to a single word" (Office Action of 8 February 2005, page 14, final paragraph). Further, the Office Action of 8 February 2005 also asserts that Brill discloses the ability of a dictionary to contain phrases, words, and spaces (page 3, final paragraph). Here, Brill discloses the ability to spell check the alphabet containing all combination of the elements of the alphabet Σ, hereafter Σ^* (Section 2 An Improved Error Model). Σ^* contains all elements including the space character. Further, Brill discloses the ability to insert, delete, and substitute alphabet characters when spell checking (Section 3 Training the Model). Brill provides the example of spell checking the phrasal string "akgsual" to "actual" by removing substituting an empty character, ε, in for "g" (Section 3

Training the Model). The use of the empty set character further indicates that Σ^* contains non-alpha numeric characters, such as the space character. The ability to spell check phrasal strings including the space character allows Brill to spell check phrasal strings containing a plurality of words, the plurality of words being separated by spaces.

As per dependent claims 3-5, 8-10, 12-17, 19-23, the applicant argues the limitations discussed above. These claims are similarly rejected.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Karttunen (US 6023760): Discloses spaces and sigma star.
- Reed (US 5095432): Discloses kleene star.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kyle R Stork whose telephone number is (571) 272-4130. The examiner can normally be reached on Monday-Friday (7:00-3:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Hong can be reached on (703) 308-5465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kyle Stork
Patent Examiner
Art Unit 2178

krs

CESAR PAULA
PRIMARY EXAMINER